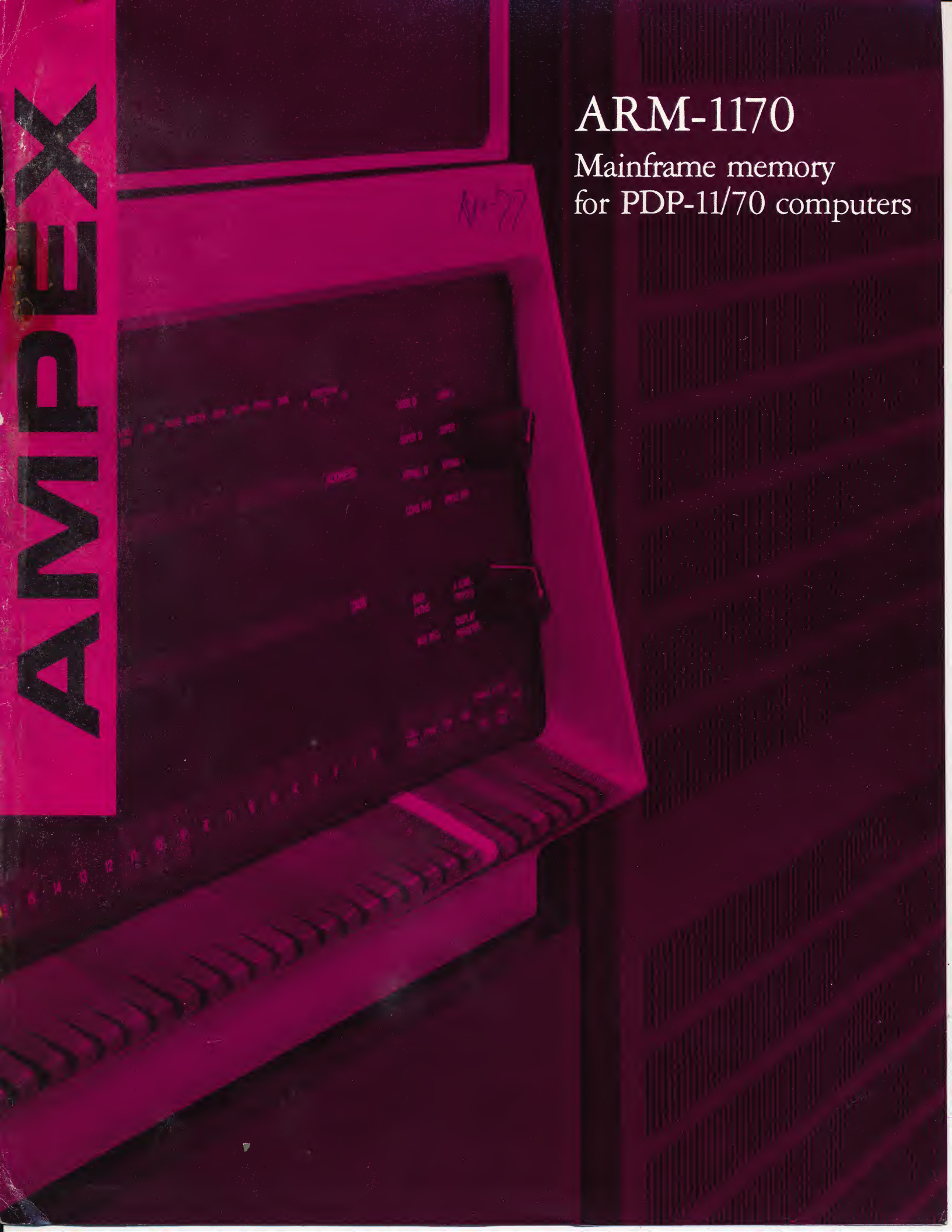


AMPLEX

ARM-1170

Mainframe memory
for PDP-11/70 computers



ARM-1170

Plug-compatible alternative mainframe memory for PDP-11/70 computer features performance enhancement and significant savings.

- Expansion to full 4 megabyte memory capacity
- 128K byte increments
- Two 1-megabyte chassis slip easily into each DEC memory cabinet
- Totally transparent
- Enhanced throughput with 2- or 4-way interleaving
- Wider operating margins with UNIBIT* cores

A supplier for today's needs

Ampex Corporation lives up to its reputation for superiority in the memory market with over three decades of research and development leadership in magnetic technologies. Since 1946, Ampex has been a major innovator of electronic equipment and components for the acquisition, storage and retrieval of data, sound and images.

The memory products division of Ampex is recognized as a leading independent supplier of cores, core stacks and memory systems. Expanding on its long experience, the division's extensive resources are devoted to the development and manufacture of core and other static memories. Billions of bits of memory are delivered each year to an impressive cross section of original equipment manufacturers. Ampex developed and delivered the first plug-interchangeable memories for IBM, Univac, and DEC System 10 computers and

UNIBIT is a trademark of Ampex Corporation.

continues to supply this enlarging market. Our depth of experience and resources are unequalled within the industry.

Compatibility plus flexibility

With the ARM-1170, PDP-11/70 computers get a real boost in performance. This advanced memory is a plug-compatible alternative to the MJ-11 memory and is totally transparent to the system. It provides 2-way or 4-way internal interleaving to enhance performance or may be externally interleaved with either MJ-11 or other ARM-1170 memories.

A single ARM-1170 chassis accommodates a minimum of 128K bytes and a maximum of 1-megabyte of memory. It is designed for mounting in a standard 19" rack and each chassis complete with cooling assembly and power supply occupies 22¾ inches of rack space. Two complete ARM-1170 units can be easily mounted in each memory cabinet to expand the PDP-1170 up to its full 4 megabyte capability.

Each chassis permits the user to start with the minimum amount of memory, then grow by simply adding plug-in expansion increments as memory needs grow.

Savings plus enhancement

Using the ARM-1170, the savings can add up to as much as 50% of the cost of an equivalent

amount of DEC memory.

Although no minimum DEC memory is required, the ARM-1170 can, of course, be intermixed with MJ-11 memory.

You'll also get a potential throughput enhancement to add to your savings with the ARM-1170. Using four-way internal interleaving, the effective average cycle time is 350 nanoseconds. The system also provides for external interleaving between memory chassis, including the MJ-11, as well as internal overlapping. The accompanying table shows the various memory capacity possibilities and their interleaving capabilities.

ARM-1170 Memory Capacity and Interleaving Relationships

Capacity K Bytes (9-Bit)	Processor K Words (16-Bit)	Memory K Words (36-Bit)	Internal Two-Way	Internal Four-Way
128	64	32		
256	128	64	YES	
384	192	96		
512	256	128	YES	YES
640	320	160		
768	384	192	YES	
896	448	224		
1,024	512	256	YES	YES
2,048	1,024	512	YES	YES
3,072	1,536	768	YES	YES
4,096*	2,048	1,024	YES	YES

* Upper 256K bytes reserved for UNIBUS references.

Note: External interleaving of all capacities is possible with memory blocks of equal size.

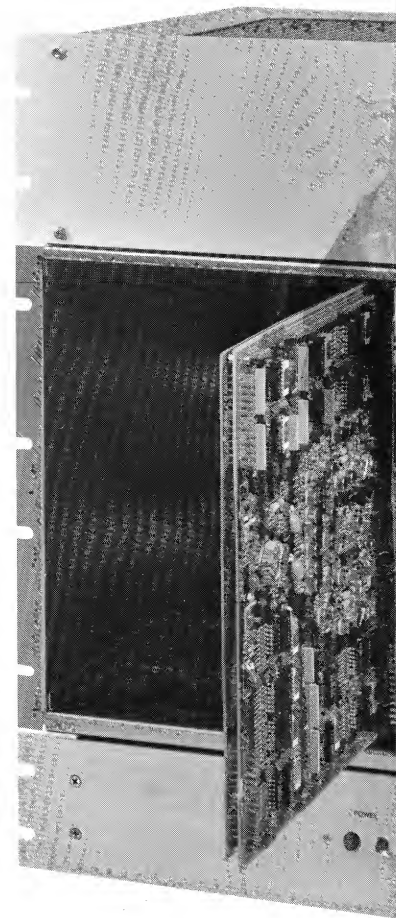
Uncompromising performance plus reliability

The memory modules employed in the ARM-1170 use Ampex 13-mil temperature independent UNIBIT cores produced by our unique tape process. The superb

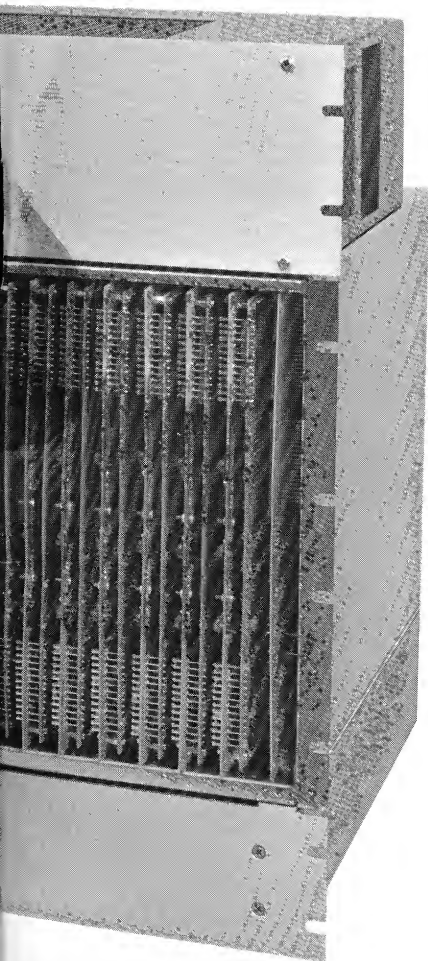
uniformity of these cores results in increased performance stability and wider margins over a greater temperature range than would normally be encountered without any degradation due to internal heating at the upper extremes. Maximum output with less coupled noise is another performance plus attained through the Ampex high density double-herringbone core pattern which permits shorter X, Y and sense lines.

Each of the memory modules used in the ARM-1170 is a completely self-contained memory. The module-to-module uniformity is such that modules may be interchanged with each other without any readjustment whatsoever.

The memory modules used in the ARM-1170 incorporate advanced design techniques that reduce component count and provide



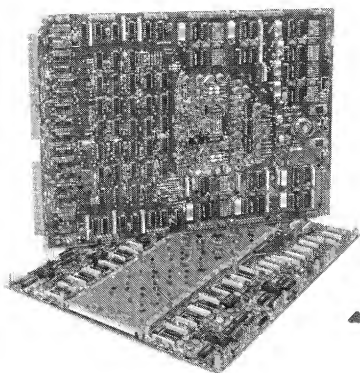
PDP and UNIBUS are trademarks of Digital Equipment Corporation.



more built-in reliability than any comparable memory.

Conservative derating practices, device qualification and careful component specification further ensure this reliability.

The ARM-1170 is connected to the memory bus through four controlled impedance flat cables. Provision is made within each chassis to provide memory bus continuity to another chassis or to terminate the bus. This permits



the use of multiple ARM-1170 memory chassis to satisfy large storage requirements.

Front access to all components is provided for the user's convenience. Each ARM-1170 is equipped with controls and indicators accessible and visible from the front. There are 9 switches for setting base address, an on-line/off-line switch and two switches for setting the interleaving mode. Four LED indicators provide parity error, memory busy, configuration error and mismatch error information.

This kind of attention to detail and understanding of the user's needs is what has made Ampex memories the first choice of original equipment manufacturers and computer users for more than twenty years.

Manufacturing quality and customer service

To ensure that the utmost reliability is built into each finished product, Ampex has developed manufacturing processes and inspection and testing standards second to none. The quality assurance department is organized in accordance with the requirements of Mil-Q-9858A. Continuous testing is performed at every level from receiving inspection to production and testing of the finished module, which includes a 24 hour burn-in at 70°C.

ARM-1170 specifications

Capacity	128K byte increments 128K bytes to one megabyte per chassis Up to 4 megabyte (4 chassis) per PDP-11/70 (less 256K bytes for UNIBUS references)	
Operating modes	Read-Restore Clear-Write (byte or word) Exchange (Read-Pause-Write with fixed pause interval)	
Operating speed	Typical (nanoseconds)	Maximum (nanoseconds)
Read/Write cycle	725	750
Write access (to acknowledge)	125	150
Read access (to data ready)	450	475
Exchange cycle	1025	1050
Exchange access (to data ready)	450	475
All times at memory system connector from leading edge of start command.		
Interleaving	2-way or 4-way internal plus combinations of internal and external	
Effective interleaved read/write cycle time	4-way—350 nanoseconds	
Interface	All signal levels, timing and memory bus loads are compatible with the PDP-11/70	
Dimensions (includes blowers and power supply)	Width: 19 inches (48.26 cm) Height: 22.75 inches (57.78 cm) Depth: 16 inches (40.64 cm)	
Weight (1 MB unit)	170 pounds (77.11 kg)	
Power	120 or 240 VAC, single phase, 47-63 Hz One megabyte unit requires 7 amperes, maximum, at 120V or 3.5 amperes, maximum at 240V.	
Operating environment	0° to + 50°C ambient temperature. Up to 90% relative humidity with no condensation	
Non-operating environment	-40° to + 100°C ambient temperature. Up to 90% relative humidity with no condensation	

Ampex reserves the right to make product and specification changes at any time without notice.



AMPEX

Ampex Corporation
Memory Products Division
200 North Nash Street
El Segundo, California 90245